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**Nucleofection of human embryonic stem cells.**

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**Public Summary:**

The ability to realize the full potential of human pluripotent stem cells (hPSCs) as tools for -understanding human development and advancing the field of regenerative medicine is dependent on efficient methods to genetically manipulate these cells. There are several methods for introducing foreign DNA into cells such as electroporation, lipid-based transfection technology, and viral transduction. We describe here a method to transfect human embryonic stem cells (hESCs) using nucleofection technology. This unique method uses the Nucleofector II Device that combines the use of a cell type-specific Nucleofector Solution and preprogrammed electrical parameters to efficiently deliver DNA into the cell nucleus. The use of this technology allows high-efficiency transfer of nucleic acids into hESCs enabling both transient and stable manipulation of gene expression in these cells. These methods will be useful for understanding how to make specialized cells from stem cells as well as for making models of human disease.

**Scientific Abstract:**

The ability to realize the full potential of human pluripotent stem cells (hPSCs) as tools for -understanding human development and advancing the field of regenerative medicine is dependent on efficient methods to genetically manipulate these cells. There are several methods for introducing foreign DNA into cells such as electroporation, lipid-based transfection technology, and viral transduction. We describe here a method to transfect human embryonic stem cells (hESCs) using nucleofection technology. This unique method uses the Nucleofector II Device that combines the use of a cell type-specific Nucleofector Solution and preprogrammed electrical parameters to efficiently deliver DNA into the cell nucleus. The use of this technology allows high-efficiency transfer of nucleic acids into hESCs enabling both transient and stable manipulation of gene expression in these cells.

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